

## ENVIRONMENTAL PROTECTION AGENCY

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### FINAL NPDES GENERAL PERMIT FOR REJECT WATER FROM REVERSE OSMOSIS UNITS

**AGENCY:** ENVIRONMENTAL PROTECTION AGENCY (EPA)

**ACTION:** NOTICE OF FINAL NPDES GENERAL PERMITS -- MAG450000

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#### SUMMARY:

The Director of the Office of Ecosystem Protection, Environmental Protection Agency-New England (EPA-NE), is issuing Notice of Final National Pollutant Discharge Elimination System (NPDES) general permits for reject water from reverse osmosis units to certain waters in the State of Massachusetts. These final NPDES general permits establish Notice of Intent (NOI) requirements, effluent limitations, standards, prohibitions, and management practices for reverse osmosis reject water.

Owners and/or operators of sites that discharge reject water from reverse osmosis units will be required to submit an NOI to EPA-NE to be covered by the appropriate general permit and will receive a written notification from EPA-NE of permit coverage and authorization to discharge under one of these general permits. The eligibility requirements are discussed in detail in Sections II and III in the fact sheet to this Federal Register Notice and the reader is strongly urged to go to that section before reading further. These general permits do not cover new sources as defined under 40 CFR §122.2.

**DATES:** The general permits shall be effective on the date specified in the final general permits published in the Federal Register and will expire five years from the date that the final permits are published in the Federal Register. If the general permits are not reissued prior to the expiration date, they will be administratively continued and remain in effect as long as the permittee submits a new notice of intent two months prior the expiration date of the general permit.

**ADDRESS:** Notice of Intent to be authorized to discharge under these permits should be sent to: United

States Environmental Protection Agency (CPE), 1 Congress Street, Suite 1100, Boston, Massachusetts 02114-2023, and Massachusetts Department of Environmental Protection, Division of Watershed Management, 627 Main Street, 2<sup>nd</sup> floor, Worcester, Massachusetts 01608.

**FOR FURTHER INFORMATION CONTACT:** Additional information concerning these final permits may be obtained between the hours of 8:00 a.m. and 4:00 p.m. Monday through Friday excluding holidays from: Betsy Davis, Office of Ecosystem Protection, Environmental Protection Agency, 1 Congress Street, Suite 1100, Boston, MA 02114-2023; telephone: 617-918-1576.

The following FACT SHEET AND SUPPLEMENTARY INFORMATION section sets forth principal facts and the significant factual, legal and policy questions considered in the development of these final general permits. A reasonable fee may be charged for copying requests.

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## Fact Sheet and Supplemental Information

### **I. Introduction**

The Director of the Office of Ecosystem Protection, EPA-New England, is issuing general permits for the discharge of reject water from reverse osmosis units to certain waters in the State of Massachusetts. This document contains Part I, the Draft General NPDES Permits and, Part II, Standard

Conditions.

## **II. Coverage of General Permits**

Section 301(a) of the Clean Water Act (the Act) provides that the discharge of pollutants is unlawful except in accordance with a National Pollutant Discharge Elimination System (NPDES) permit unless such a discharge is otherwise authorized by the Act. EPA's regulations authorize the issuance of "general permits" to one or more categories or subcategories of discharges (see 40 CFR §122.28 ). EPA may issue a single, general permit to a category of point sources located within the same geographic area whose discharges warrant similar pollution control measures.

A. The Director of an NPDES permit program is authorized to issue a general permit if there are a number of point sources operating in a geographic area that:

1. Involve the same or substantially similar types of operations;
2. Discharge the same types of wastes;
3. Require the same effluent limitations or operating conditions;
4. Require the same or similar monitoring requirements; and
5. In the opinion of the Director, are more appropriately controlled under a general permit than under individual permits.

Authorization under these general permits shall require prior submittal of certain facility information. Upon receipt of all required information, the permit issuing authority may allow or disallow coverage under these general permits.

B. The similarity of the discharge is prompting EPA to issue these general permits.

When issued, these permits will enable facilities to maintain compliance with the Act, will extend environmental and regulatory controls to new dischargers, and will avoid a backlog of individual permit applications. The issuing of these general permits in Massachusetts is warranted by the similarity of environmental conditions; State regulatory requirements applicable to the discharges and receiving

waters; and the technology employed.

Violations of a condition of a general permit constitute a violation of the Clean Water Act and subjects the discharger to the penalties in Section 309 of the Act.

### **III. Exclusions**

These general permits will not be available to:

1. facilities whose discharge(s) could cause or contribute to adverse water quality impacts.
2. mobile water purification units using reverse osmosis as a means of water treatment.
3. facilities whose wastewater is treated with a reverse osmosis system, that are required to follow established effluent guidelines and standards pursuant to 40 CFR Subchapter N.
4. facilities when the Director requires an individual permit, based on considerations of the following:
  - a. The variability of the pollutants or pollutant parameters in the effluent based on chemical specific information.
  - b. Recommendations from the State.
  - c. Other considerations which the Director determines could cause or contribute to adverse water quality impacts.

EPA has determined that these general permits will not be available to “New Source” dischargers as defined in 40 CFR §122.2 due to the site specific nature of the environmental review required by the National Environmental Policy Act of 1969 (NEPA), 33 U.S.C. 4321 *et seq.* for those facilities. “New Sources” must comply with New Source Performance Standards (NSPS) and are subject to the NEPA process in 40 CFR §6.600. Consequently, EPA has determined that it would be more appropriate to address “New Sources” through the individual permit process.

Any owner or operator authorized by a general permit may request to be excluded from coverage of a general permit by applying for an individual permit. This request may be made by

submitting a NPDES permit application together with reasons supporting the request. The Director may also require any person authorized by a general permit to apply for and obtain an individual permit. Any interested person may petition the Director to take this action. However, individual permits will not be issued for sources covered by these general permits unless it can be clearly demonstrated that inclusion under one of these general permits is inappropriate. The Director may consider the issuance of individual permits when:

1. The discharger is not in compliance with the terms and conditions of the general permit;
2. A change has occurred in the availability of demonstrated technology or practices for the control or abatement of pollutants applicable to the point source;
3. Effluent limitation guidelines are subsequently promulgated for the point sources covered by the general NPDES permit;
4. A Water Quality Management Plan or Total Maximum Daily Load (TMDL) containing requirements applicable to such point sources is approved;
5. Circumstances have changed since the time of the request to be covered so that the discharger is no longer appropriately controlled under the general permit, or either a temporary or permanent reduction or elimination of the authorized discharge is necessary;
6. The discharge(s) is a significant contributor of pollution or in violation of State Water Quality Standards for the receiving water; or
7. The discharge(s) is into an impaired water of the Federal Clean Water Act 303 (d) list, and the pollutant/stressor listed on the 303 (d) list is one of the parameters limited in the permit.

In accordance with 40 CFR §122.28(b)(3)(iv), the applicability of the general permit is automatically terminated on the effective date of the individual permit.

#### **IV. Permit Basis and Other Conditions of the General NPDES Permit**

A. Statutory Requirements: Section 301(a) of the Clean Water Act (CWA or the Act), 33 U.S.C. 1311(a), makes it unlawful to discharge pollutants to waters of the United States without a

permit. Section 402 of the Act, 33 U.S.C. 1342, authorizes EPA to issue NPDES permits allowing discharges that will meet certain requirements, including CWA sections 301, 304, and 401 (33 U.S.C. 1331, 1314, and 1341). Those statutory provisions state that NPDES permits must include effluent limitations requiring authorized discharges to: (1) meet standards reflecting specified levels of technology-based treatment requirements; (2) comply with State Water Quality Standards; and (3) comply with other state requirements adopted under authority retained by states under CWA §510, 33 U.S.C. 1370.

EPA is required to consider technology and water quality requirements when developing permit limits. 40 CFR Part 125 Subpart A sets the criteria and standards that EPA must use to determine which technology-based requirements, requirements under section 301(b) of the Act and/or requirements established on a case by case basis under Section 401(a)(1) of the Act, should be included in the permit.

B. Antidegradation Provisions

The conditions of the permit reflect the goal of the CWA and EPA to achieve and maintain water quality standards. The environmental regulations pertaining to the State Antidegradation Policies which protect the State's surface waters from degradation of water quality is found in the following provision: Massachusetts Water Quality Standards 314 CMR 4.04 Antidegradation Provisions.

These general permits do not apply to any new or increased discharge to receiving waters unless the discharge is shown to be consistent with the State's antidegradation policies. This determination shall be made in accordance with the appropriate State antidegradation implementation procedures for these general permits. EPA will not authorize discharges under these general permits until it receives a favorable antidegradation review and certification from the States. (Concurrent to the publication of these general permits in the Federal Register, EPA has formally requested the State to make an antidegradation certification determination). The Commonwealth of Massachusetts will conduct antidegradation reviews for notices of intent to discharge, under these general permits, into Class A waters.



C. Effluent Limitations

1. Technology-based Effluent Limitations: EPA has not promulgated National Effluent Guidelines for reverse osmosis reject water discharges. EPA also believes that the limits established to meet the water quality standards discussed below are sufficient to satisfy Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology (BAT/BCT) described in Section 304(a) of the Act. Therefore, as provided in Section 402(a)(1) of the Act, EPA has determined to issue these general permits utilizing Best Professional Judgement (BPJ) to meet the above stated criteria for BAT/BCT described in Section 304(b) of the Act. Accordingly, monthly average and maximum daily limitations for Total Suspended Solids (TSS) and Total Residual Chlorine are established based upon Best Professional Judgement pursuant to Section 402(a)(1) of the CWA.

2. Water Quality Based Effluent Limitations: Under Section 301(b)(1)(C) of the Act, discharges are subject to effluent limitations based on water quality standards when EPA and the State determine that effluent limits more stringent than technology-based limits are necessary to maintain or achieve state or federal water quality standards. A water quality standard consists of three elements: (1) designated beneficial uses, (2) a numeric or narrative water-quality criteria sufficient to protect the assigned designated use(s), and (3) an antidegradation policy that ensures that water quality improvements are conserved, maintained, and protected. Receiving stream requirements are established according to numerical and narrative standards adopted under state and/or federal law for each stream use classification. Section 401 of the CWA requires that EPA obtain State certification which ensures that all water quality standards and other appropriate requirements of state law will be satisfied. Regulations governing State certification are set forth in 40 CFR Sections 124.53 and 124.55. The State of Massachusetts has narrative criteria in their water quality regulations. See Massachusetts 314 CMR 4.05(5)(e) that prohibits toxic discharges in toxic amounts. These permits do not allow for the addition of materials or chemicals which would produce a toxic effect to any aquatic life. Reverse osmosis reject water shall not contain or come in contact with raw materials, intermediate products,

finished products or process wastes. Therefore, it could be assumed that the discharges do not contain toxic or hazardous pollutants or oil or grease. Nevertheless, toxic effects may still occur as a result of toxic source water, toxic pollutants due to the use of chlorine or due to dissolution of the piping in the local water systems that is typically the source of water used in reverse osmosis. Any reverse osmosis reject water which would violate water quality standards established for toxic or hazardous pollutants would not qualify for these general permits and an individual permit would be required. Water quality criteria applicable to reverse osmosis reject water discharges covered by these general permits include pH, copper, and ammonia. A summary of the effluent limitations are described below:

#### pH

These general permits include proposed pH limitations which are required by state water quality standards and are at least as stringent as pH limitations set forth at 40 CFR 133.102. The water quality criteria for the pH limitations for Massachusetts can be found at 314 CMR 4.05.

#### Copper, Total

EPA is required to limit any pollutant that is or may be discharged at a level that has caused, or has reasonable potential to cause, or contributes to an excursion above any water quality criterion.

Copper may be toxic to aquatic life at low concentrations, so the permits contain numerical limits for total recoverable copper and specifies an appropriate method of analysis. The copper limits have been calculated (see Attachment B) to reflect the water quality criteria published in the Federal Register on December 10, 1998. The maximum daily limit for copper based on the acute water quality criteria is 73 ug/l and the average monthly limit, based on the chronic criteria, is 52 ug/l when the dilution factor is between 10 and 99. The maximum daily limit for copper based on the acute water quality criteria is 730 ug/l and the average monthly limit, based on the chronic criteria, is 516 ug/l when the dilution factor is between 100 and 1000.

#### Nitrogen, Total Ammonia

Chloramines are introduced into the water source used in reverse osmosis units when the units are

bleached or cleaned with hypochlorite. Ammonia in the source water reacts with hypochlorite creating chloramines causing the reject water to contain ammonia. Therefore, Total Ammonia Nitrogen is required to be monitored monthly. This parameter will be used in conjunction with additional water quality data to evaluate whether ammonia from reverse osmosis units has a potential impact on the receiving water.

#### D. Monitoring and Reporting Requirements

Effluent limitations and monitoring requirements which are included in the general permits describe the requirements to be imposed on the facilities to be covered. Facilities covered by the final general permits will be required to submit to EPA New England and the Massachusetts Department of Environmental Protection a Discharge Monitoring Report (DMR) containing effluent data. The frequency of reporting is determined in accordance with the State's provisions.

The monitoring requirements have been established to yield data representative of the discharge under authority of Section 308(a) of the Act and 40 CFR 122.41(j), 122.44(i) and 122.48, and as certified by the State.

#### E. Endangered Species

The proposed limits are sufficiently stringent to assure that water quality standards for both aquatic life protection and human health protection will be met. The effluent limitations established in these permits ensure protection of aquatic life and maintenance of the receiving water as an aquatic habitat. The Region finds that adoption of these final permits are unlikely to adversely affect any threatened or endangered species or its critical habitat. EPA will consult with the United States Fish and Wildlife Service and National Marine Fisheries Service on this determination. The US Fish and Wildlife Service and the National Marine Fisheries Service will notify EPA for any new listings.

The National Marine Fisheries Service has indicated that the endangered shortnose sturgeon (*Acipenser brevirostrum*) inhabits certain sections of the Merrimack and Connecticut Rivers in Massachusetts. Any facility whose discharge may adversely effect the sturgeon or any other threatened

or endangered species or its habitat, is required to contact the National Marine Fisheries at the following address: US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), Habitat and Protected Resources Division, One Blackburn Drive, Gloucester, MA 01903-2298.

#### F. Standard Permit Conditions

40 CFR 122.41 and 122.42 establish requirements which must be in all NPDES permits.

Specific language will be provided to permittees in Part II of the permit.

#### G. State (401) Certification

Section 401 of the CWA provides that no Federal license or permit, including NPDES permits, to conduct any activity that may result in any discharge into navigable waters shall be granted until the State in which the discharge originates certifies that the discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of the CWA. EPA-NE will request that the Commonwealth of Massachusetts conduct Section 401 reviews and issue a State certification. In addition, EPA and the Commonwealth of Massachusetts will jointly issue the final permits.

#### H. Environmental Impact Statement Requirements

These general permits do not authorize discharges from any new sources as defined under 40 CFR 122.2. Therefore, the National Environmental Policy Act, 33 U.S.C. §§4321 *et seq.*, does not apply to the issuance of these general NPDES permits.

#### I. National Historic Preservation Act of 1966, 16 USC SS470 *et seq.*

Facilities which adversely affect properties listed or eligible for listing in the National Registry of Historic Places under the National Historic Preservation Act of 1966, 16 USC SS470 *et seq.* are not authorized to discharge under this permit.

#### J. Essential Fish Habitat

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Sect. 1801 *et seq.* (1998)), EPA is required to consult with NMFS if

EPA's action or proposed actions that it funds, permits or undertakes, "may adversely impact any essential fish habitat." 16 U.S.C. Sect. 1855(b). The Amendments broadly define "essential fish habitat" (EFH) as "waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 16 U.S.C. Sect. 1802(10). Adverse impact means any impact which reduces the quality and/or quantity of EFH. 50 CFR Sect. 600.910(a). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative or synergistic consequences of actions.

Essential Fish Habitat is only designated for fish species for which federal Fisheries Management Plans exist. 16 U.S.C. Sect. 1855(b)(1)(A). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

The proposed limits for these general permits are sufficiently stringent to assure that state water quality standards will be met. The effluent limitations established in these permits ensure protection of aquatic life and maintenance of the receiving water as an aquatic habitat. The Region finds that adoption of the proposed permit is unlikely to adversely affect any fish or shellfish currently listed with a Fisheries Management Plan or its critical habitat. EPA will seek written concurrence from the National Marine Fisheries Service on this determination.

## **V. Other Legal Requirements**

### **A. Executive Order 12866**

EPA has determined that the general permits are not a "significant regulatory action" under the terms of Executive Order 12866 and is therefore not subject to OMB review.

### **B. Paperwork Reduction Act**

The information collection requirements of these permits were previously approved by the Office of Management and Budget under the provisions of the Paperwork Reduction Act. 44 U.S.C.3501 *et seq.*, and assigned OMB control number 2040-0086 (NPDES permit application) and

2040-0004 (Discharge Monitoring Reports).

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA), 5 U.S.C. 601 *et seq.*, requires that EPA prepare a regulatory flexibility analysis for rules subject to the requirements of 5 U.S.C. 553(b) that have a significant impact on a substantial number of small entities. The permits issued today, however, are not a “rule” subject to the requirements of 5 U.S.C. 553(b) and, are therefore, not subject to the Regulatory Flexibility Act.

D. Unfunded Mandates Reform Act

Section 201 of the Unfunded Mandates Reform Act (UMRA), Public Law 104-4, generally requires Federal agencies to assess the effects of their “regulatory actions” (defined to be the same as “rules” subject to the RFA) on tribal, state and local governments and the private sector. The permits issued today, however, are not a “rule” subject to the RFA and, are therefore, not subject to the requirements of UMRA.

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Dated

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Robert W. Varney  
Regional Administrator

**PART I - FINAL GENERAL PERMIT UNDER THE NATIONAL POLLUTANT DISCHARGE  
ELIMINATION SYSTEM (NPDES)**

[NOTE: Part IA and Part IB contain general permits for the state of Massachusetts (both Commonwealth and Indian Country Lands). ]

A. MASSACHUSETTS GENERAL PERMIT, Permit No. MAG450000

In compliance with the provisions of the Federal Clean Water Act, as amended, (33 U.S.C. §§ 1251 *et seq.*; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§ 26-53), operators of facilities located in Massachusetts, which discharge reject water from reverse osmosis units to the classes of waters as designated in the Massachusetts Water Quality Standards, 314 CMR 4.00 *et seq.*, are authorized to discharge to all waters, unless otherwise restricted, in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective when issued. This permit and the authorization to discharge expire at midnight, five years from the effective date of the publication in the Federal Register.

Signed this     day of

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Linda M. Murphy, Director  
Office of Ecosystem Protection  
U.S. Environmental Protection Agency  
Boston, MA

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Glenn Haas, Director  
Division of Watershed Management  
Bureau of Resource Protection  
Massachusetts Department of Environmental  
Protection, Boston, MA

## PART I

### EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge reject water from reverse osmosis units. This permit is only for facilities discharging to freshwater with a dilution factor from 10 to less than 100.
  - a. Each outfall discharging effluent from reverse osmosis units shall be limited and monitored as specified below. Monitoring for each outfall shall be reported.

<u>Effluent Characteristics</u>	<u>Units</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
		Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
Flow <sup>1,3,4</sup>	MGD	Report	****	Report	Continuous	Recorder
TSS <sup>3,4</sup>	mg/l lbs/day	30 Report	**** ****	45 Report	1/Month 1/Month	24-Hour Composite <sup>5</sup> 24-Hour Composite <sup>5</sup>
Total Residual Chlorine <sup>3,4,6</sup>	mg/l	0.11	****	0.2	1/Week	Grab
pH <sup>2,3,4</sup>	S.U.	(See conditions I.A.1.g)			1/Week	Grab
Dissolved Oxygen	mg/l	NOT LESS THAN 6.0			1/Week	Grab
Ammonia <sup>3,4</sup>	ug/l	Report	****	Report	1/Month	Grab
Copper, Total <sup>3,4,7</sup>	ug/l	52	****	73	1/Month	24-Hour Composite <sup>5</sup>
LC-50 and C-NOEC, (%) <sup>8</sup>	see Part 1.A.1.k					24-Hour Composite <sup>5</sup>



Footnotes:

1. The flow shall be continuously measured and recorded using a flow meter.
2. Requirement for State Certification.
3. Samples shall be taken only when discharging, and prior to mixing with stormwater. All samples shall be tested using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. All samples shall be 24-hour composites unless specified as a grab sample in 40 CFR §136.
4. In addition to the monthly monitoring requirements, the permittee is required to sample the effluent and report the results twice per year when the reverse osmosis units are cleaned. The reason for the additional sampling and reporting requirements is due to the potential of an increased load of pollutants being discharged to the receiving stream during the cleaning process.
5. A 24-hour composite sample will be conducted of at least 1 grab sample taken each hour during periods of discharge.
6. The minimum level (ML) for chlorine is defined as 50 ug/l. This value is the minimum level for chlorine using EPA approval methods found in most currently approved version of Standard Methods for the Examination of Water and Wastewater Method 4500 CL-E and G, or UNITED STATES ENVIRONMENTAL PROTECTION AGENCY Manual of Methods of Analysis of Water and Wastewater, Method 330.5. One of these methods must be used to determine total residual chlorine. For effluent limitations less than 50 ug/l, compliance/non-compliance will be determined on ML. Sample results of less than 50 ug/l or less shall be reported as zero on the discharge monitoring report.
7. The minimum level (ML) for copper is defined as 5 ug/l. This value is the minimum level for copper using the Furnance Atomic Absorption analytical method ( EPA Method 220.2). For effluent limitations of less than 5 ug/l, compliance/non-compliance will be determined based on the ML from this method, or another approved method that has an equivalent or lower ML, one of which must be used. Sample

results of 5 ug/l or less shall be reported as zero on the Discharge Monitoring Report.

8. LC-50 is the concentration of effluent in a sample that causes mortality to 50% of the test population at a specific time of observation. C-NOEC, No Observed Effect Concentration, is the highest concentration of effluent to which organisms are exposed in a life-cycle test or partial life-cycle test which cause no adverse effect on growth, survival and reproduction at a specific time of observation as determined from hypothesis testing where the test results (growth, survival, and/or reproduction) exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, report the lowest concentration where there is no observable effect. End of Footnotes.

**PART I - FINAL GENERAL PERMIT UNDER THE NATIONAL POLLUTANT DISCHARGE  
ELIMINATION SYSTEM (NPDES)**

[NOTE: Part IA and Part IB contain general permit for the state of Massachusetts (both Commonwealth and Indian Country Lands). ]

**B. MASSACHUSETTS GENERAL PERMIT, Permit No. MAG450000**

In compliance with the provisions of the Federal Clean Water Act, as amended, (33 U.S.C. §§ 1251 *et seq.*; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§ 26-53), operators of facilities located in Massachusetts, which discharge reject water from reverse osmosis units to the classes of waters as designated in the Massachusetts Water Quality Standards, 314 CMR 4.00 *et seq.*, are authorized to discharge to all waters, unless otherwise restricted, in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective when issued. This permit and the authorization to discharge expire at midnight, five years from the effective date of the publication in the Federal Register.

Signed this     day of

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Linda M. Murphy, Director  
Office of Ecosystem Protection  
U.S. Environmental Protection Agency  
Boston, MA

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Glenn Haas, Director  
Division of Watershed Management  
Bureau of Resource Protection  
Massachusetts Department of Environmental  
Protection, Boston, MA

## PART I

### EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge reject water from reverse osmosis units. This permit is only for facilities discharging to freshwater with a dilution factor from 100 to 1000.
  - a. Each outfall discharging effluent from reverse osmosis units shall be limited and monitored as specified below. Monitoring for each outfall shall be reported.

<u>Effluent Characteristics</u>	<u>Units</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
		Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
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TSS <sup>3,4</sup>	mg/l lbs/day	30 Report	**** ****	45 Report	1/Month 1/Month	24-Hour Composite <sup>5</sup> 24-Hour Composite <sup>5</sup>
Total Residual Chlorine <sup>3,4,6</sup>	mg/l	1.0	****	1.0	1/Week	Grab
pH <sup>2,3,4</sup>	S.U.	(See conditions I.A.1.g)			1/Week	Grab
Dissolved Oxygen	mg/l	NOT LESS THAN 6.0			1/Week	Grab
Ammonia <sup>3,4</sup>	ug/l	Report	****	Report	1/Month	Grab
Copper, Total <sup>3,4,7</sup>	ug/l	516	****	730	1/Month	24-Hour Composite <sup>5</sup>
LC and C-NOEC, (%) <sup>8</sup>	see Part 1.A.1.k.					24-Hour Composite <sup>5</sup>

Footnotes:

1. The flow shall be continuously measured and recorded using a flow meter.
2. Requirement for State Certification.
3. Samples shall be taken only when discharging, and prior to mixing with stormwater. All samples shall be tested using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. All samples shall be 24-hour composites unless specified as a grab sample in 40 CFR §136.
4. In addition to the monthly monitoring requirements, the permittee is required to sample the effluent and report the results twice a year when the reverse osmosis units are cleaned. The reason for the additional sampling and reporting requirements is due to the potential of an increased load of pollutants being discharged to the receiving stream during the cleaning process.
5. A 24-hour composite sample will be conducted of at least 1 grab sample taken each hour during periods of discharge.
6. The minimum level (ML) for chlorine is defined as 50 ug/l. This value is the minimum level for chlorine using EPA approval methods found in most currently approved version of Standard Methods for the Examination of Water and Wastewater, Method 4500 CL-E and G, or UNITED STATES ENVIRONMENTAL PROTECTION AGENCY Manual of Methods of Analysis of Water and Wastes, Method 330.5. One of these methods must be used to determine total residual chlorine. For effluent limitations less than 50 ug/l, compliance/non-compliance will be determined on ML. Sample results of less than 50 ug/l or less shall be reported as zero on the discharge monitoring report.
7. The minimum level (ML) for copper is defined as 5 ug/l. This value is the minimum level for copper using the Furnance Atomic Absorption analytical method ( EPA Method 220.2). For effluent limitations of less than 5 ug/l, compliance/non-compliance will be determined based on the ML from this method, or another approved method that has an equivalent or lower ML, one of which must be used. Sample results of 5 ug/l or less shall be reported as zero on the Discharge Monitoring Report.

8. LC-50 is the concentration of effluent in a sample that causes mortality to 50% of the test population at a specific time of observation. C-NOEC, No Observed Effect Concentration, is the highest concentration of effluent to which organisms are exposed in a life-cycle test or partial life-cycle test which cause no adverse effect on growth, survival and reproduction at a specific time of observation as determined from hypothesis testing where the test results (growth, survival, and/or reproduction) exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, report the lowest concentration where there is no observable effect. End of Footnotes.

Part 1.A.1. Effluent Limitations and Monitoring Requirements for all permits (continued)

- b. The discharge shall not cause a violation of the water quality standards of the receiving water.
- c. The discharge shall not cause an objectionable discoloration of the receiving water.
- d. There shall be no discharge of floating solids or visible foam in other than trace amounts.
- e. The results of sampling for any parameter above its required frequency must also be reported.
- f. Samples taken in compliance with the monitoring requirements specified above shall be taken at a location that provides a representative analysis of the effluent just prior to discharge to the receiving water or if the effluent is commingled with another discharge, prior to such commingling.
- g. The pH of the effluent for discharges to Class A and Class B waters shall be in the range of 6.5-8.3 standard units and not more than 0.5 units outside of the background range. There shall be no change from background conditions that would impair any uses assigned to the receiving water Class.
- h. The use of products containing formaldehyde is prohibited.
- i. There shall be no discharge of biocides, pathogenic organisms, toxic, radioactive, corrosive substances at levels or in combinations sufficient to be toxic or harmful to humans, animals, plant or aquatic life, or in amounts to interfere with State Water Quality Standards.
- j. The discharge shall not cause the dissolved oxygen level in the receiving water to drop below 6.0 mg/l.
- k. Chronic (and modified acute) toxicity test(s) shall be performed on the effluent from reverse

osmosis systems by the permittee upon request by EPA and/or the MA DEP. Testing shall be performed in accordance with EPA toxicity protocol to be provided at the time of the request. The test shall be performed on a 24-hour composite sample to be taken during normal facility operation. The result of the test(s) shall be forwarded to both the EPA and the State within 30 days after completion.

B. STATE PERMIT CONDITIONS

1. These NPDES Discharge Permits are issued jointly by the U. S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MADEP) under Federal and State law, respectively. As such, all the terms and conditions of these permits are hereby incorporated into and constitute discharge permits issued by the Commissioner of the Massachusetts Department of Environmental Protection to M.G.L. Chap. 21, §43.

2. Each Agency shall have the independent right to enforce the terms and conditions of these permits. Any modification, suspension or revocation of these permits shall be effective only with respect to the Agency taking such action, and shall not affect the validity or status of these permits as issued by the other Agency, unless and until each Agency has concurred in writing with such modification, suspension or revocation. In the event any portion of these permits are declared, invalid, illegal or otherwise issued in violation of State law such permits shall remain in full force and effect under Federal law as an NPDES Permit issued by EPA. In the event these permits are declared invalid, illegal or otherwise issued in violation of Federal law, these permits shall remain in full force and effect under State law as permits issued by the Commonwealth of Massachusetts.

C. COMMON ELEMENTS OF ALL PERMITS

1. Conditions of the General Permit

a. Geographic Areas: Massachusetts (Permit No. MAG450000). All of the discharges to be authorized by these general NPDES permits for dischargers in the Commonwealth of Massachusetts are into all waters of the Commonwealth as specified in Part I.A. of these permits unless otherwise restricted by the Massachusetts Surface Water Quality Standards, 314 CMR 4.00 (or as revised).

b. Exclusions: These permits are not available for discharges into impaired waters on the Federal

Clean Water Act 303(d) list which are not attaining state water quality standards for the parameters limited in the permit. These general permits are not available to “New Source” dischargers as defined in 40 CFR § 122.2.

c. Notification by Permittees: Operators of sites whose discharge, or discharges are effluent from reverse osmosis units and whose sites are located in the geographic areas described in Part I.C.1.a. above, shall submit to the Regional Administrator, EPA-NE, a Notice of Intent to be covered by the appropriate general permit. Notifications must be submitted by all permittees who are seeking coverage under these permits. This written notification must include for each individual site, the owner's and/or operator's legal name, address and telephone number; the site's name, address, contact name, and telephone number; the number and type of sites (SIC code) to be covered; the site location(s); the number of discharge points, and the anticipated duration, volume, and rate of discharge for each outfall; a topographic map (or other map if a topographic map is not available) indicating the site's location(s) and discharge point(s); latitude and longitude of outfall(s); a description of any wastewater treatment; schematic of the reverse osmosis system; the name(s) of the receiving waters into which discharge will occur; antidegradation review where necessary (see Section IV.C of the Fact Sheet); new and increased discharges from reverse osmosis activities that may adversely affect a listed or proposed to be listed endangered or threatened species or its critical habitat are not authorized under these general permits (see Section IV. E of the Fact Sheet). The notice must be signed in accordance with the signatory requirements of 40 CFR §122.22.

Each facility must certify that the discharge for which it is seeking coverage under one of these general permits consists solely of reject water from discharges from reverse osmosis units. An authorization to discharge under one of these general permits, where the reverse osmosis unit discharges to a municipal or private storm drain owned by another party, does not convey any rights or authorization to connect to that drain.

Each site must also submit a copy of the Notice of Intent to the Massachusetts DEP. Copies of the State Application Form Appendix E (BRP WM 11b), and the Transmittal Form for Permit Application and Payment, may be obtained at the DEP website at ([www.state.ma.us/dep](http://www.state.ma.us/dep)) <([www.state.magnet.us/dep](http://www.state.magnet.us/dep)); > by clicking on “Permit Applications” and “Watershed Management”; by



telephoning the DEP Info Service Center (Permitting) at 617-338-2255 or 1-800-462-0444 in 508, 413, 978 and 781 area codes; or from any DEP Regional Service Center located in each Regional Office.

Three copies of the transmittal form are needed. Copy 1 (the original) of the transmittal form and Appendix E should be sent to Massachusetts Department of Environmental Protection, 627 Main Street, 2<sup>nd</sup> floor, Worcester, MA 01608. Copy 2 of the transmittal form and the \$295 fee should be sent to DEP, P.O. Box 4062, Boston, MA 02111. Municipalities are fee-exempt, but should send a copy of the transmittal form to that address. Keep Copy 3 of the transmittal form and a copy of the application package for your records.

The sites authorized to discharge under one of these final general permits will receive written notification from EPA-NE with State concurrence. Failure to submit to EPA-NE a Notice of Intent to be covered and/or failure to receive from EPA-NE written notification of permit coverage means that the facility is not authorized to discharge under one of these general permits. Sites who are denied permit coverage by EPA-NE are not authorized under these general permits to discharge from those sites to the receiving waters.

## 2. ADMINISTRATIVE ASPECTS

a. Request to be covered: A facility is not covered by any of these general permits until it meets the following requirements. First, it must send a Notice of Intent (NOI) to EPA-NE and Massachusetts DEP indicating it meets the requirements of the permit and wants to be covered. And second, it must be notified in writing by EPA-NE that it is covered by one of these general permits.

b. Eligibility to Apply : Any facility operating under an effective (unexpired) individual NPDES permit may request that the individual permit be revoked and that coverage under one of these general permits be granted, as outlined in 40 CFR § 122.28(b)(3)(v). If EPA revokes the individual permit, the general permit would apply to the discharge.

Facilities with expired individual permits that have been administratively continued in accordance with 40 CFR§ 122.6 may apply for coverage under one of these general permits. When coverage is granted the expired individual permit automatically will cease being in effect.

Proposed new dischargers may apply for coverage under one of these general permits and must submit the NOI 90 days prior to the discharge.

c. Continuation of General Permit After Expiration: If these permits are not reissued prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedures Act and remain in force and in effect as to any particular permittee as long as the permittee submits a new Notice of Intent two (2) months prior to the expiration date in the permit. However, once these permits expire EPA cannot provide written notification of coverage under either of these general permits to any permittee who submits Notice of Intent to EPA after the permit's expiration date. Any permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:

- (1) Reissuance of these permits, at which time the permittee must comply with the Notice of Intent conditions of the new permit to maintain authorization to discharge; or
- (2) The permittee's submittal of a Notice of Termination; or
- (3) Issuance of an individual permit for the permittee's discharges; or
- (4) A formal permit decision by the Director not to reissue these general permits, at which time the permittee must seek coverage under an alternative general permit or an individual permit.

**D. MONITORING AND REPORTING**

Monitoring results obtained during each calendar month shall be summarized and recorded on separate Discharge Monitoring Report Form(s), postmarked no later than the 15<sup>th</sup> day of following month. All communications and any required submittals should be sent to both EPA-NE and the appropriate State office at the following addresses:

1. EPA-NE  
U.S. Environmental Protection Agency, New England Region  
Water Technical Unit (SEW)  
Post Office Box 8127  
Boston, MA 02114
2. MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
  - a. The Regional Offices wherein the discharge occurs, shall receive a copy of all notifications

and communications:

Massachusetts Department of Environmental Protection  
Western Regional Office  
436 Dwight Street  
Springfield, MA 01103

Massachusetts Department of Environmental Protection  
Southeastern Regional Office  
20 Riverside Drive  
Lakeville, MA 02347

Massachusetts Department of Environmental Protection  
Northeastern Regional Office  
205A Lowell Street  
Wilmington, MA 01887

Massachusetts Department of Environmental Protection  
Central Regional Office  
627 Main Street, 2<sup>nd</sup> floor  
Worcester, Massachusetts 01608

- b. Copies of all notifications required by these permits shall also be submitted to the State at:

Massachusetts Department of Environmental Protection  
Division of Watershed Management

627 Main Street, 2<sup>nd</sup> floor

Worcester, MA 01608

E. ADDITIONAL GENERAL PERMIT CONDITIONS.

1. Termination of Operations: Operators of facilities and/or operations authorized under these permits shall notify the Director upon the termination of discharges. The notice must contain the name, mailing address, and location of the facility for which the notification is submitted, the NPDES permit number for the reverse osmosis reject water discharge identified by the notice, and an indication of whether the reverse osmosis reject water discharge has been eliminated or the operator of the discharge has changed. The notice must be signed in accordance with the signatory requirements of 40 CFR §122.22.

2. When the Director May Require Application for an Individual NPDES Permit

a. The Director may require any person authorized by these permits to apply for and obtain an individual NPDES permit. Any interested person may petition the Director to take such action. Instances where an individual permit may be required include the following:

- (1) The discharge(s) is a significant contributor of pollution;
- (2) The discharger is not in compliance with the conditions of the permit;
- (3) A change has occurred in the availability of the demonstrated technology of practices for the control or abatement of pollutants applicable to the point source;
- (4) Effluent limitation guidelines are promulgated for point sources covered by the permit;
- (5) A Water Quality Management Plan or Total Maximum Daily Load containing requirements applicable to such point source is approved;
- (6) Discharge to the territorial sea;
- (7) Discharge into waters that are not attaining state water quality standards; or,
- (8) The point source(s) covered by the permit no longer:
  - (a) Involves the same or substantially similar types of operations;
  - (b) Discharges the same types of wastes;
  - (c) Requires the same effluent limitations or operating conditions;

(d) Requires the same or similar monitoring; and

(e) In the opinion of the Director, it is more appropriately controlled under an individual permit than under one of these general NPDES permits.

b. The Director may require an individual permit only if the permittee authorized by the general permit has been notified in writing that an individual permit is required, and has been given a brief explanation of the reasons for this decision.

3. When an Individual NPDES Permit may be Requested

a. Any operator may request to be excluded from the coverage of these general permits by applying for an individual permit.

b. When an individual NPDES permit is issued to an operator otherwise subject to the general permit, the applicability of the permit to that owner or operator is automatically terminated on the effective date of the individual permit.

F. SUMMARY OF RESPONSE TO COMMENTS

A) Comment submitted by, National Pretreatment Program, US EPA, Washington D.C.

Comment #1: I have reviewed the draft General Permit (MAG450000) and have concerns regarding the vast availability of coverage under this permit for any type of generated wastewater that uses Reverse Osmosis as its treatment process.

In particular, I know of some industrial facilities whose wastewaters are subject to Effluent Guidelines and Standards (40 CFR Subchapter N or specifically, 40 CFR 405-471) that use Reverse Osmosis as their treatment processes. Specifically, pharmaceutical facilities, metal finishers and a textile facility. If we do not provide an exclusion for such facilities that are already subjected to effluent guidelines and standards, we are not fully satisfying the requirements of 40 CFR 122.44(a)(2) and relying on the “permit as a shield” concept for all pollutants listed within those standards.

Response: This permit is not intended for facilities that generate industrial wastewaters who are subject to Effluent Guidelines and Standards under 40 CFR Subchapter N. If effluent guidelines and standards exists then it is possible that an individual permit would be needed to reflect

the standards in the guidelines. Additional language has been included in the final permit under section III. Exclusions, that states if Effluent Guidelines and Standards exists facilities are required to follow them to treat wastewater even if a reverse osmosis system is part of the treatment process.

Therefore, this permit is only meant for coverage of discharges of RO reject water from facilities using RO as a treatment process to purify potable water for various further uses.

This permit is not intended to authorize discharge from RO units used from wastewater treatment as a stand alone process or in combination with other treatment processes.

B) Comment submitted by the Army National Guard Bureau, Environmental Programs Division, Arlington, Virginia.

Comment #2: The Army National Guard (ARNG) uses reverse osmosis water purification units (ROWPUs) in the field during training exercises. ARNG personnel train with this equipment to prepare for foreign or domestic emergency water incidents. An initiative that we in the Water Program here at National Guard Bureau (NGB) have been pushing is the use of the Modular Multi-Fluid Filtration System (MMFFS), which is used to treat post-ROWPU “reject water” down to almost drinking water quality. The MMFFS is a mobile unit that follows the ROWPU in the field. Several states have even allowed Army personnel to discharge MMFFS-treated water straight to the ground or to the stormwater system after they reviewed the water quality standards the MMFFS delivers.

Please consider adding language to the Final Rule which discusses MMFFS and MMFFS-type ROWPU “reject water” treatment systems. And where does this piece of equipment fall into regulation within the context of the proposed rule?

Response: The reject water from Modular Multi-Fluid Filtration Systems will not be covered under this permit. The intent of this general permit is for facilities that discharge RO reject to the same surface water body over time, and it is only for coverage of facilities in Massachusetts. The reject water from a MMFFS unit potentially could be discharged to a any number of surface water bodies, and in several states For instance, when a unit was ready to be discharged

how would the permittee know that the dilution of each receiving stream was greater than 10 to 1? How would the permittee take copper samples when the reject water was being discharged to different water bodies? Discharge from these units could not meet the requirements in the general permit. Discharges from these systems are not regulated under this General Permit.

C) Comment submitted by Massachusetts Resource Authority (MWRA), Boston, Massachusetts

Comment #3: Reduce the Monitoring Frequency Requirements For Each Outfall

Dischargers that receive the NPDES General Permit will be required to conduct *weekly* sampling for Total Residual Chlorine, pH, and Dissolved Oxygen. The sampling frequency seems to be excessive. MWRA is concerned that excessive sampling costs will discourage dischargers from obtaining and complying with this permit.

Response: The weekly sampling frequency in the draft permit will help ensure compliance with the permit requirements on a consistent basis. EPA feels that weekly sampling and analysis for TRC, pH, and DO are routine, inexpensive, and easily performed procedures. RO reject water discharges may be intermittent and prone to periodic fluctuations in quality, thus EPA is requiring weekly sampling and analysis for these parameters.

Comment #4: Require continuous pH recording For Each Outfall

Rather than, or in addition to, a weekly Grab sampling event for pH, we believe that a continuous pH-recording device on the discharge line would provide more representative monitoring. Generally, the MWRA finds the installation of a continuous pH-recording device helpful, because it provides a thorough pH characterization of the discharge.

Response: The analytical methods specified in 40 CFR Part 136 are required for all monitoring performed under the NPDES program, and grab samples are the required pH collection method. Since the quality and flow of the wastestream for reverse osmosis systems are not highly variable grab samples will remain the method of collection for pH samples.

Comment #5: Identify who should conduct sample analyses required by the General Permit

The proposed analytical activities required by the General Permit should be conducted by

Mass. DEP certified lab. Most dischargers will not have the in-house expertise to conduct these analyses as required by 40 CFR 136.

Response: As long as analytical methods in 40 CFR 136 are used to determine characteristics in the effluent, EPA does not require permittee's to use MA certified labs for analytical testing.

Comment #6: Expand the General Permit's coverage to include water from the backwash filters from incoming water treatment.

In addition to RO reject water, MWRA prohibits any filter backwash discharge, unless specifically authorized by an MWRA permit. The General Permit would help minimize clean water discharges to the sewer systems in the Commonwealth of Massachusetts if it covered filter backwash discharges from incoming water treatment filters.

Response: EPA has determined that this general permit will authorize only the discharge of reject water from RO units. Including other discharges such as filter backwash waters would unnecessarily complicate this permit and perhaps require individual permits to be issued.

#### TRC limits

The TRC limits in the final permit are more stringent than what was published in the draft permit. After careful consideration, EPA and MA DEP determined that the average monthly and maximum daily TRC limits of 1.0 mg/l published in the draft permit would not meet water quality criteria with dilution factors between 10 and 99. Therefore the limits were changed in the final permit to be protective of surface water.

Chlorine and chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. The effluent limits for daily maximum Total Residual Chlorine (TRC) were developed using the acute and chronic criterion defined in the EPA Quality Criteria for Water, 1986 (Gold Book), as adopted by the MADEP into the State Water Quality Standards. The criterion was multiplied by the available receiving water dilution. The criterion states that the average total residual chlorine in the receiving water should not exceed 11 ug/l for chronic toxicity protection and the maximum daily total residual chlorine in the receiving water should not exceed 19 ug/l for acute toxicity production.

#### Toxicity Test

EPA and MA DEP have added language to the final permit that requires that permittee to submit toxicity test



results upon request.

## **Part II            STANDARD CONDITIONS**

### **A.                    GENERAL REQUIREMENTS**

1. Duty to Comply: The permittee must comply with all conditions of this permit. Any permit in noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

a. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

b. The CWA provides that any person who violates sections 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any of such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Sections 402 (a)(3) or 402 (b)(8) of the CWA is subject to a civil penalty not to exceed \$25,000 per day for each violation. Any person who negligently violates such requirements is subject to a fine of not less than \$2,500 nor more than \$25,000 per day of violation, or by imprisonment for not more than 1 year, or both. Any person who knowingly violates such requirements is subject to a fine of not less than \$5,000 nor more than \$50,000 per day of violation, or by imprisonment for not more than 3 years, or both. Note: See 40 CFR Section 122.41(a)(2) for additional enforcement criteria.

c. Any person may be assessed an administrative penalty by the Administrator for violating sections 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA. Administrative penalties for Class I violations are not to exceed \$10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed \$25,000. Penalties for Class II violations are not to exceed \$10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed \$125,000.

2. Permit Actions: This permit may be modified, revoked and reissued, or terminated for cause.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

3. Duty to Provide Information: The permittee shall furnish to the Regional Administrator, within a reasonable time, any information which the Regional Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Regional Administrator, upon request, copies of records required to be kept by this permit.

4. Reopener Clause: The Regional Administrator reserves the right to make appropriate revisions to this permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the CWA in order to bring all discharges into compliance with the CWA.

5. Oil and Hazardous Substance Liability: Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the CWA, or Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

6. Property Rights: The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges.

7. Confidentiality of Information:

a. In accordance with 40 CFR Part 2, any information submitted to EPA pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR Part 2 (Public Information).

b. Claims of confidentiality for the following information will be denied:

(i) The name and address of any permit applicant or permittee;

(ii) Permit applications, permits, and effluent data as defined in 40 CFR § 2.302(a)(2).

c. Information required by NPDES application forms provided by the Regional Administrator under Section 122.21 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

8. Duty to Reapply: If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. The permittee shall submit a new notice of intent at least 60 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Regional Administrator. (The Regional Administrator shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

9. State Authorities: Nothing in Part 122, 123, or 124 precludes more stringent State regulation of any activity covered by these regulations, whether or not under an approved State program.

10. Other Laws: The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, and local laws and regulations.

B. OPERATIONS and MAINTENANCE of POLLUTION CONTROL

1. Proper Operation and Maintenance: The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce Not a Defense: It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Duty to Mitigate: The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely

affecting human health or the environment.

4. Bypass:

a. Definitions

(1) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Paragraphs B.4.c and 4.d of this section.

c. Notice.

(1) Anticipated bypass: If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2) Unanticipated bypass: The permittee shall submit notice of an unanticipated bypass as required in Paragraph D.1.e (24-hour notice).

d. Prohibition of bypass:

(1) Bypass is prohibited, and the Regional Administrator may take enforcement action against a permittee for bypass, unless:

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(c)(i) The permittee submitted notices as required under Paragraph 4.c of this section.

(ii) The Regional Administrator may approve an anticipated bypass, after considering its adverse effects, if the Regional Administrator determines that it will meet the three conditions listed above in Paragraph 4.d of this section.

5. Upset

a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary non-compliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Paragraph B.5.c of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

- (1) An upset occurred and that the permittee can identify the cause(s) of the upset;
- (2) The permitted facility was at the time being properly operated;
- (3) The permittee submitted notice of the upset as required in Paragraphs D.1.a and 1.e (24-hour notice); and
- (4) The permittee complied with any remedial measures required under B.3. above.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

C. MONITORING and RECORDS

1. Monitoring and Records

- a. Samples and measurements taken for the purpose of monitoring shall be representative of the

monitored activity.

b. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application except for the information concerning storm water discharges which must be retained for a total of 6 years. This retention period may be extended by request of the Regional Administrator at any time.

c. Records of monitoring information shall include:

- (1) The date, exact place, and time of sampling or measurements;
- (2) The individual(s) who performed the sampling or measurements;
- (3) The date(s) analyses were performed;
- (4) The individual(s) who performed the analyses;
- (5) The analytical techniques or methods used; and
- (6) The results of such analyses.

d. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.

e. The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

2. Inspection and Entry: The permittee shall allow the Regional Administrator, or an authorized

representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

- a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

D. REPORTING REQUIREMENTS

1. Reporting Requirements

a. Planned changes. The permittee shall give notice to the Regional Administrator as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR §122.29(b); or

(2) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject to the effluent limitations in the permit, nor to the notification requirements under 40 CFR §122.42(a)(1).

(3) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition or change may justify the application of permit conditions different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

b. Anticipated noncompliance. The permittee shall give advance notice to the Regional Administrator of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. Transfers. This permit is not transferable to any person except after notice to the Regional Administrator. The Regional Administrator may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act. (See §122.61; in some cases, modification or revocation and reissuance is mandatory.)

d. Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(1) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Regional Administrator for reporting results of monitoring of sludge use or disposal practices.

(2) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Regional Administrator.

(3) Calculations for all limitations which require averaging of measurement shall utilize an arithmetic mean unless otherwise specified by the Regional Administrator in the permit.

e. Twenty-four hour reporting.

(1) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(2) The following shall be included as information which must be reported within 24 hours under this paragraph.



- (a) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See §122.41(g))
- (b) Any upset which exceeds any effluent limitation in the permit.
- (c) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Regional Administrator in the permit to be reported within 24 hours. (See §122.44(g))
- (3) The Regional Administrator may waive the written report on a case-by-case basis for reports under Paragraph D.1.e if the oral report has been received within 24 hours.
- f. Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.
- g. Other noncompliance. The permittee shall report all instances of noncompliance not reported under Paragraphs D.1.d, D.1.e and, D.1.f of this section at the time monitoring reports are submitted. The reports shall contain the information listed in Paragraph D.1.e of this section.
- h. Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Administrator, it shall promptly submit such facts or information.

## 2. Signatory Requirement

- a. All applications, reports, or information submitted to the Regional Administrator shall be signed and certified. (See §122.22)
- b. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

3. Availability of Reports: Except for data determined to be confidential under Paragraph A.8. above, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statement on any such

report may result in the imposition of criminal penalties as provided for in §309 of the CWA.

E. OTHER CONDITIONS

1. Definitions for purposes of this permit are as follows:

Administrator means the Administrator of the United States Environmental Protection Agency, or an authorized representative.

Applicable standards and limitations means all State, interstate, and Federal standards and limitations to which a "discharge" or a related activity is subject to, including water quality standards, standards of performance, toxic effluent standards or prohibitions, "best management practices," and pretreatment standards under §§301, 302, 303, 304, 306, 307, 308, 403, and 405 of CWA.

Application means the EPA standard national forms for applying for a permit, including any additions, revisions or modifications to the forms; or forms approved by EPA for use in "approved States," including any approved modifications or revisions.

Average means the arithmetic mean of values taken at the frequency required for each parameter over the specified period. For total and/or fecal coliforms, the average shall be the geometric mean.

Average monthly discharge limitation means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average weekly discharge limitation means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Best Professional Judgement (BPJ) means a case-by-case determination of Best Practicable Treatment (BPT), Best Available Treatment (BAT) or other appropriate standard based on an

evaluation of the available technology to achieve a particular pollutant reduction.

Composite Sample - A sample consisting of a minimum of eight grab samples collected at equal intervals during a 24-hour period (or lesser period as specified in the section on Monitoring and Reporting) and combined proportional to flow, or a sample continuously collected proportionally to flow over that same time period.

Continuous Discharge means a "discharge" which occurs without interruption throughout the operating hours of the facility except for infrequent shutdowns for maintenance, process changes, or similar activities.

CWA or "The Act" means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483 and Pub. L. 97-117; 33 U.S.C. §§1251 *et seq.*

Daily Discharge means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the daily discharge is calculated as the average measurement of the pollutant over the day.

Director means the person authorized to sign NPDES permits by EPA and/or the State.

Discharge Monitoring Report Form (DMR) means the EPA standard national form, including any subsequent additions, revisions, or modifications, for the reporting of self-monitoring results by permittees. DMRs must be used by "approved States" as well as by EPA. EPA will supply DMRs to any approved State upon request. The EPA national forms may be modified to substitute the State Agency name, address, logo, and other similar information, as appropriate, in place of EPA's.

Discharge of a pollutant means:

(a) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source," or

(b) Any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a

means of transportation. This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works. This term does not include an addition of pollutants by any "indirect discharger."

Effluent limitation means any restriction imposed by the Director on quantities, discharge rates, and concentrations of "pollutants" which are "discharged" from "point sources" into "waters of the United States," the waters of the "contiguous zone," or the ocean.

Effluent limitations guidelines means a regulation published by the Administrator under §304(b) of CWA to adopt or revise "effluent limitations."

EPA means the United States "Environmental Protection Agency."

Grab Sample - An individual sample collected in a period of less than 15 minutes.

Hazardous Substance means any substance designated under 40 CFR Part 116 pursuant to §311 of CWA.

Maximum daily discharge limitation means the highest allowable "daily discharge."

Municipality means a city, town, borough, county, parish, district, association, or other public body created by or under State law and having jurisdiction over disposal or sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribe organization, or a designated and approved management agency under §208 of CWA.

National Pollutant Discharge Elimination System means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under §§307, 402, 318, and 405 of CWA. The term includes an "approved program."

New discharger means any building, structure, facility, or installation:

- (a) From which there is or may be a "discharge of pollutants";
- (b) That did not commence the "discharge of pollutants" at a particular "site" prior to August 13, 1979;

(c) Which is not a "new source"; and

(d) Which has never received a finally effective NPDES permit for discharges at that "site".

This definition includes an "indirect discharger" which commences discharging into "waters of the United States" after August 13, 1979. It also includes any existing mobile point source (other than an offshore or coastal oil and gas exploratory drilling rig or a coastal oil and gas developmental drilling rig) such as a seafood processing rig, seafood processing vessel, or aggregate plant, that begins discharging at a "site" for which it does not have a permit; and any offshore or coastal mobile oil and gas exploratory drilling rig or coastal mobile oil and gas developmental drilling rig that commences the discharge of pollutants after August 13, 1979, at a "site" under EPA's permitting jurisdiction for which it is not covered by an individual or general permit and which is located in an area determined by the Regional Administrator in the issuance of a final permit to be an area of biological concern. In determining whether an area is an area of biological concern, the Regional Administrator shall consider the factors specified in 40 CFR §§125.122.(a)(1) through (10).

An offshore or coastal mobile exploratory drilling rig or coastal mobile developmental drilling rig will be considered a "new discharger" only for the duration of its discharge in an area of biological concern.

New source means any building, structure, facility, or installation from which there is or may be a "discharge of pollutants," the construction of which commenced:

(a) After promulgation of standards of performance under §306 of CWA which are applicable to such.

(b) After proposal of standards of performance in accordance with §306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with §306 within 120 days of their proposal.

NPDES means "National Pollutant Discharge Elimination System."

Non-Contact Cooling Water is water used to reduce temperature which does not come in direct contact with any raw material, intermediate product, a waste product or finished product.

Owner or operator means the owner or operator of any "facility or activity" subject to

regulation under the NPDES programs.

Permit means an authorization, license, or equivalent control document issued by EPA or an "approved State."

Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point source means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§ 2011 *et seq.*)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

(a) Sewage from vessels; or

(b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Primary industry category means any industry category listed in the NRDC settlement agreement (Natural Resources Defense Council et al. v. Train, 8 E.R.C. 2120 (D.D.C. 1976), modified 12 E.R.C. 1833 (D.D.C. 1979)); also listed in Appendix A of 40 CFR Part 122.

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Regional Administrator means the Regional Administrator, EPA-New England, Boston,

Massachusetts.

State means any of the 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Trust Territory of the Pacific Islands.

Secondary Industry Category means any industry category which is not a "primary industry category."

Toxic pollutant means any pollutant listed as toxic in Appendix D of 40 CFR Part 122, under §307(a)(1) of CWA.

Uncontaminated storm water is precipitation to which no pollutants have been added and has not come into direct contact with any raw material, intermediate product, waste product or finished product.

Waters of the United States means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(b) All interstate waters, including interstate "wetlands";

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

- (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;
- (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce;
- or,
- (3) Which are used or could be used for industrial purposes by industries in interstate commerce;
- (d) All impoundments of waters otherwise defined as waters of the United States under this definition;
- (e) Tributaries of waters identified in paragraphs (a) (d) of this definition;
- (f) The territorial sea; and
- (g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands)

identified in paragraphs (a) - (f) of this definition.

Whole Effluent Toxicity (WET) means the aggregate toxic effect of an effluent measured directly by a toxicity test.

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

2. Abbreviations when used in this permit are defined below:

cu. M/day or M3/day	cubic meters per day
mg/l	milligrams per liter
ug/l	micrograms per liter
lbs/day	pounds per day
kg/day	kilograms per day
Temp. °C	temperature in degrees Centigrade
Temp. °F	temperature in degrees Fahrenheit
Turb.	turbidity measured by the Nephelometric Method (NTU)
pH	a measure of the hydrogen ion concentration
CFS	cubic feet per second
MGD	million gallons per day
Oil & Grease	Freon extractable material
ml/l	milliliter(s) per liter
Cl <sub>2</sub>	total residual chlorine



Attachment A  
Dilution Factor Calculations

Equation used to calculate available dilution factor at Outfall 001.

$$\text{Dilution Factor} = \frac{(Q_{001} + (Q_{FD} \times 1.547))}{Q_{FD} \times 1.547}$$

where:

$Q_{001}$  = Estimated 7Q10 flow\* at Outfall 001, in cubic foot/seconds (cfs)

$Q_{FD}$  = Facility's design flow, in million gallons per day (MGD)

1.547 = Factor to convert MGD to CFS

\* The 7Q10 is the lowest observed mean river flow for 7 consecutive days, recorded over a 10-year recurrence interval.

Example Calculation

$Q_{001} = 325$  cfs

$Q_{FD} = 3.2$  MGD

Attachment B  
Copper Calculation

Copper limits for dilutions between 10 and 99

Estimated hardness = 50

$$\ln 50 = 3.912$$

chronic copper limit: criterion continuous concentration

$$\begin{aligned} e^{[(0.8545 * 3.912) + (-1.702)]} * 10.0 &= 5.159 \times 10.0 \\ &= 51.59 \text{ ug/l} \\ &= 52 \text{ ug/l} \end{aligned}$$

acute copper limit

$$\begin{aligned} e^{[(0.9422 * 3.912) + (-1.700)]} * 10.0 &= 7.285 \times 10.0 \\ &= 72.85 \text{ ug/l} \\ &= 73 \text{ ug/l} \end{aligned}$$

Copper limits for dilutions between 100 and 1000

Estimated hardness = 50

$$\ln 50 = 3.912$$

chronic copper limit: criterion continuous concentration

$$\begin{aligned} e^{[(0.8545 * 3.912) + (-1.702)]} * 100.0 &= 5.159 \times 100.0 \\ &= 515.59 \text{ ug/l} \\ &= 516 \text{ ug/l} \end{aligned}$$

acute copper limit

$$\begin{aligned} e^{[(0.9422 * 3.912) + (-1.700)]} * 100.0 &= 7.285 \times 100.0 \\ &= 728.85 \text{ ug/l} \\ &= 730 \text{ ug/l} \end{aligned}$$